Editorial: Surgical failure after gas injection

The article by Johnston, Maguire, and Logan, in this month's issue, raises some interesting questions.

The vitreal cavity no longer enjoys the privacy it had in earlier days as the more advanced techniques of surgery for detachment increasingly include an invasion of the vitreous with gases, fluids, and a variety of instruments. So far as gases are concerned, air with or without supplementary sulphur hexafluoride seems to be most commonly used. Whereas fluids, either balanced salt solution or silicone oil, may be considered largely as 'space fillers' after quantities of subretinal fluid have been removed, gas has a more specific function. It is said to 'tamponade the break,' though I would prefer the term to 'block up the hole.' Of course it is not really the gas that blocks up the hole; it is the surface-tension-generated skin around the bubble, which I suppose comes to more or less the same thing.

On reading the aforementioned article I was rather uneasy about the explanation of the observed phenomenon: the apparent disturbance of previously flat holes elsewhere or, worse still, the production of holes in previously imperforate lattice elsewhere by means of a gas bubble to a superior position in the vitreal cavity. Consider case 1: a man had a superior detachment with a U tear but also three other tears in flat retina below. After drainage, 1 ml of SF₆ gas was injected into the vitreous cavity. Later the three inferior tears came off, and it is recorded that 'the intravitreal gas bubble opened the inferior tears widely by increasing vitreoretinal traction when the patient was erect.'

This conclusion needs fairly careful consideration. One might start by running through the sequence of events. Here was an eye with a superior detachment and subretinal fluid. The subretinal fluid was removed

and the eye presumably collapsed to suit. Ocular volume was restored by an injection of gas 'into the vitreous body' *before* scleral buckling.

If we assume that vitreoretinal bands were present, it is fair to say that directly or indirectly various parts of the retina would tend to be connected with one another via the bands. Thus, if initially (when the detachment occurred) a horseshoe tear is 'pulled down' by the vitreous and its bands, it stands to reason that if it is pushed up again with an air bubble the same bands will exert traction on the lower retina. In other words, it is not the air bubble that pulls the lower retina off: it is the upper retina that pulls it off via the vitreoretinal bands. It follows from this that if a large enough buckle is put in *before* the air injection the phenomenon should not occur, since upward movement of the superior retina at the site of the tear would be minimised.

We may look at it another way and consider the bubble within the vitreous invested in its surface-tension-generated skin. Around the bubble the vitreous fibres are certainly stretched, hence exerting extra tension on the supplementary tears: all the more reason to buckle first.

These may be worrying thoughts but in practice do they really matter? If results such as we are now used to seeing in papers by detachment experts, such as the 96% and 90% rates quoted in two selected references in Johnston, Maguire, and Logan's paper, are typical, then perhaps the problems are more theoretical than practical. However, the authors are certainly to be congratulated for bringing this hazard to our attention and possibly initiating work which might lead to even further refinements in retinal detachment technique.

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